



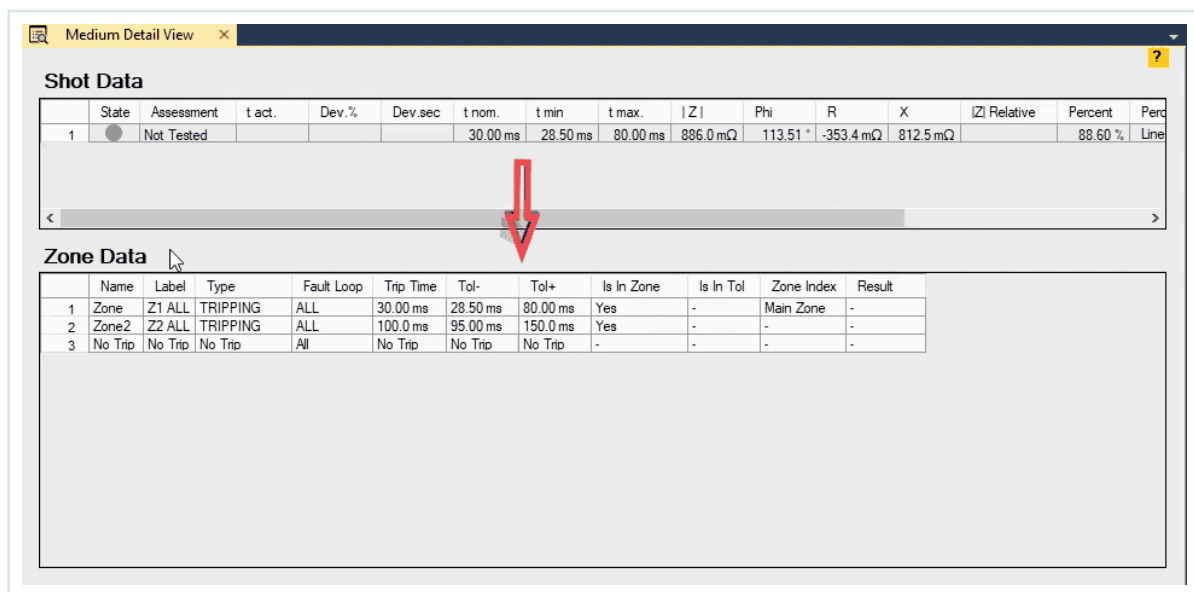
VEBKO ONLINE HELP

“Zt Diagram” and “Medium Detail View” Windows

Category	tester
Section	AMT Distance Module
Language	English
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1 Test points and their characteristics in "Medium Detail View"

To start first open "Medium Detail View" window from the toolbar and move it to an appropriate location. Characteristics of every point are displayed in "Medium Detail Window" with details. This window consists of two tables of "Shot data" and "Zone data". In "Shot data" table, the information related to time, impedance, test point as well as current and voltage of the test point are shown. "Zone data" table is composed of two main parts. In the first part, general information related to relay zones along with the allowed operation time for each one is displayed and it is the same for all selected points. But the second part of this table changes according to the selected test point.



Shot Data

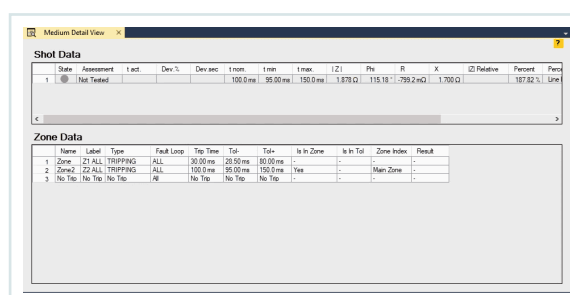
	State	Assessment	t act.	Dev. %	Dev. sec	t nom.	t min	t max.	Z	Phi	R	X	Z Relative	Percent	Perc
1	●	Not Tested				30.00 ms	28.50 ms	80.00 ms	886.0 mΩ	113.51 °	-353.4 mΩ	812.5 mΩ		88.60 %	Line

Zone Data

	Name	Label	Type	Fault Loop	Trip Time	Tol-	Tol+	Is In Zone	Is In Tol	Zone Index	Result
1	Zone	Z1 ALL	TRIPPING	ALL	30.00 ms	28.50 ms	80.00 ms	Yes	-	Main Zone	-
2	Zone2	Z2 ALL	TRIPPING	ALL	100.0 ms	95.00 ms	150.0 ms	Yes	-	-	-
3	No Trip	No Trip	No Trip	All	No Trip	No Trip	No Trip	-	-	-	-

Figure 1

For example, if a point in zone 2 is selected, the general information of the zones will be displayed in "Zone Data" table without any change. But in "Is in Zone" column in the second table, it is specified that in which zones the selected point is located. In "Is in Tol" column it is specified whether the selected point is located in the tolerance zone or not. In "Zone Index" column, the main zone related to the selected test point is specified. If the point is located in only one zone, that zone will be considered as the main zone but it should be noted that if the point is located in multiple zones, the zone with the shortest nominal time will be considered as the main zone.



Shot Data

	State	Assessment	t act.	Dev. %	Dev. sec	t nom.	t min	t max.	Z	Phi	R	X	Z Relative	Percent	Perc
1	●	Not Tested				100.0 ms	95.00 ms	150.0 ms	1.878 Ω	115.18 °	-759.2 mΩ	1.700 Ω		187.82 %	Line

Zone Data

	Name	Label	Type	Fault Loop	Trip Time	Tol-	Tol+	Is In Zone	Is In Tol	Zone Index	Result
1	Zone	Z1 ALL	TRIPPING	ALL	30.00 ms	28.50 ms	80.00 ms	-	-	-	-
2	Zone2	Z2 ALL	TRIPPING	ALL	100.0 ms	95.00 ms	150.0 ms	Yes	-	Main Zone	-
3	No Trip	No Trip	No Trip	All	No Trip	No Trip	No Trip	-	-	-	-

Figure 2

2 "ZT Diagram" window and points related to "Check Line" and "Search Line"

To open "ZT Diagram" window, "View" menu or the toolbar should be used. On this window the time diagram based on impedance, according to the operation characteristic of the relay zones along a specific angle is displayed which the most important application of this in the software is finding the test points for "Search Test" and "Check Test". Note that the diagram on this window is linked with "Impedance View" and any point that is "shot" on one of these two windows will be "shot" on the other window accordingly. In the curve of this window, the vertical lines are the border of zones and between the two vertical lines, the time-impedance characteristic of the zones in the angle specified by the user is displayed. On this window, tolerances are displayed with dotted lines and zones.

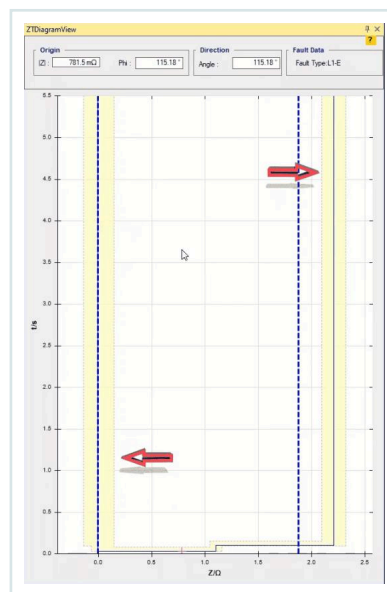


Figure 3

Let us use an example to explain how this diagram works. If "Test View" is on "Shot Test", and 0.5 ohm and 65 degrees are entered in "Z" and "Phi" fields in "ZT Diagram" window respectively, you can see that the point corresponding to this "Shot" is displayed on "Impedance View". Note that in "Shot Test", the values of "Angle" and "Phi" are the same because "Angle" refers to the angle of the line drawn from the point specified in "Origin", with "X-R" diagram as its origin. By specifying it, the variation of time – impedance curve in "Angle" is displayed in "ZT Diagram" window. This means that if the "Angle" is 65 degrees, "ZT Diagram" shows the time variation based on the impedance in this angle. In this angle, the impedance moves from zone 1 with 30 ms to zone 2 with 100 ms and then moves from zone 2 up to "No Trip" zone. By moving on this diagram and clicking on its different sections, you can see the movement of "Magnet Cursor" in "Impedance View".

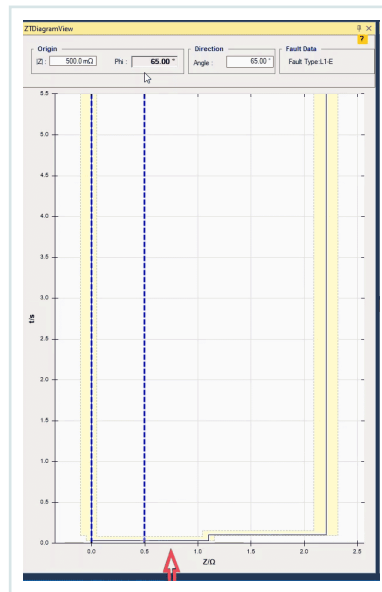


Figure 4

To make it clear, if in "ZT Diagram" window, the "Angle" is changed to 40 degrees, you can see that the "ZT Diagram" changes because in 40 degrees angle, the impedance only changes from zone 1 to "No Trip". In fact, by changing the angle, the "ZT" curve changes according to the zones available on its impedance course. In this diagram, you can see two blue dotted lines which the left side line indicate the " $|Z|=0$ " line which is the minimum allowed impedance value. As you already know, impedance cannot be smaller than zero. The right side line indicates the selected point.

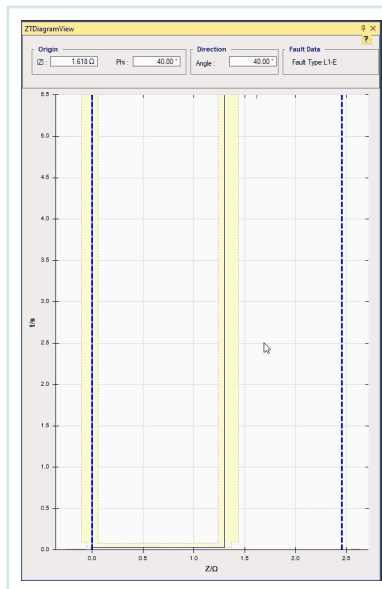


Figure 5

But in "Search Test" and "Check Test", "Angle" is there angle of the drawn line "Phi" is the origin impedance angle of "Search Line" or "Check Line", and values of them are different. For example, if in "Check Test" a "Check Line" is drawn from zone 1 to "No Trip", you can see the time based on

impedance diagram in "ZT Diagram" window in the angle where the line is drawn. In this diagram you can see two blue dotted lines where the first line indicates the start point and the second line indicates the end point of the "Check Line". Note that in this state, the " $|Z|=0$ " line is the start or origin point of the "Check Line" and the other blue line is the end point of the "Check Line" and the distance between these lines is the length of the "Check Line".

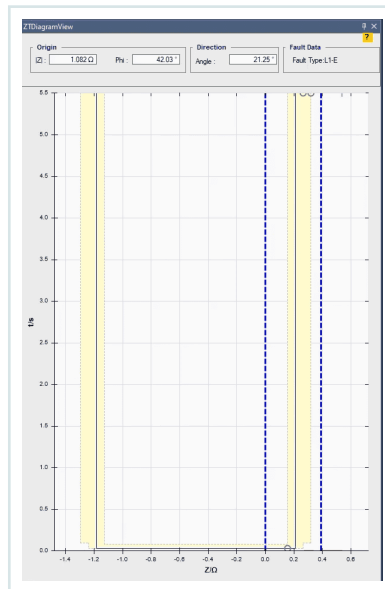


Figure 6

An important point for understanding the concept of "Check Test" is that when a "Check Line" is drawn, the software starts moving on the line and adding a "Shot" on places where the tolerance is broken on the "ZT Diagram". Here, as you can see, since there are three fractures along the "Check Line" in "ZT Diagram", three "Shots" are added. In this case, the difference between "Search Test" and "Check Test" is that in "Search Test" the software does not add a "Shot" on all tolerance fractures on the "Search Line" but from the zone line towards both ends, it only adds a "Shot" to the first tolerance fracture.

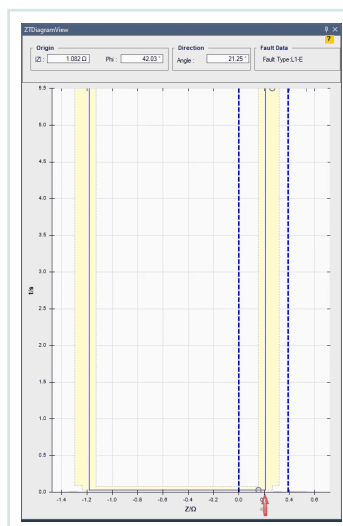


Figure 7

Another point is that if you draw a "Search Line" or "Check Line" like this figure, you can see that in addition to adding "Shots" on places where the tolerance is fractured on the "ZT Diagram", the software adds a "Shot" inside the zone and in the middle of the "ZT" characteristic accordingly. To explain this, if the line drawn from within a zone crosses a zone with different operation time but no point is "Shot" from that zone, the software adds a "Shot" to a point on "Search Line" or "Check Line" in the middle of its characteristic in "ZT Diagram" and "Impedance View".

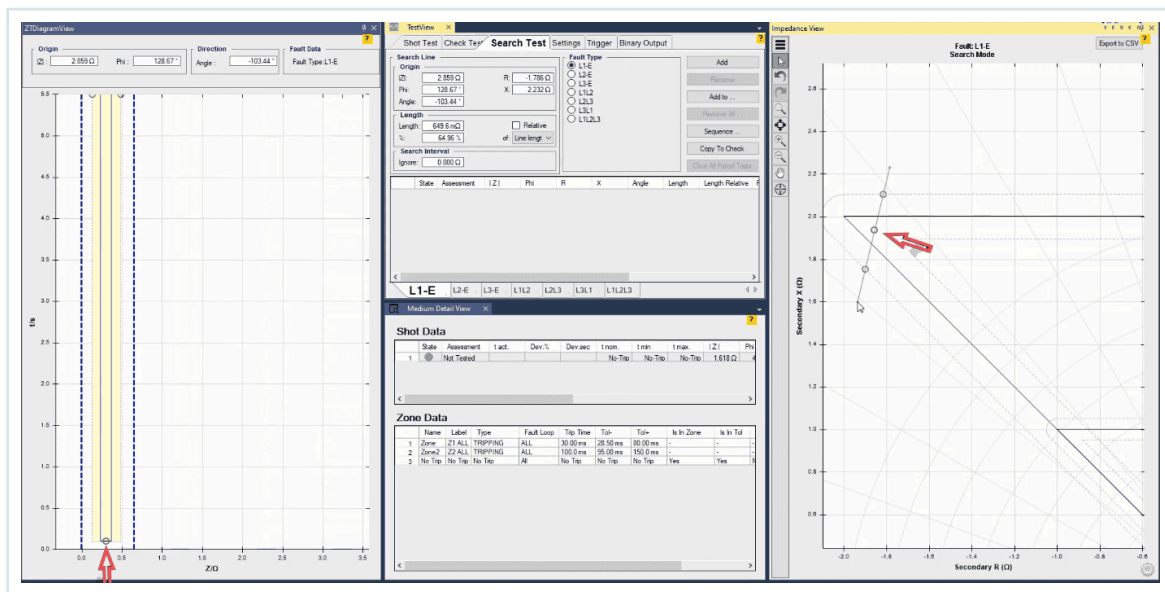


Figure 8

[jg1]ZT_Diagram_and_Medium_Detail_View_windows